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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/544,156	Applicant(s) KOJIMA ET AL.	
	Examiner CHRISTOPHER M. CRUTCHFIELD	Art Unit 4144	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *01 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *9/22/2006, 8/1/2005*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Detailed Office Action

Claims 1-19 are pending and have been examined.

35 USC 112 Second Paragraph

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Regarding claims 4 and 5 the phrase e.g. renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Objections

3. Claims 16, 18, and 19 are objected to because of the following informalities: they contain the abbreviation i.e. It is suggested that this be written out. Appropriate correction is required.

Anticipation Rejections

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-5** are rejected under 35 U.S.C. 102(b) as being clearly anticipated by X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking).

For Claim 1, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses an optical network comprising:

a. Sections for establishing optical paths (Page 5, Figure 1, Connection between X1 and X2). (X1 and X2 are Optical Cross Connects [OXCs] and establish optical paths [Page 5, “X1, X2, X3,…are Optical Cross Connects (OXCs)])

b. A plurality of optical edge routers (Figure 1, X1 and X3) for connecting external IP networks (Figure 1, Client B and Client A) to the optical network. (X1 and X3 are border network elements [BNEs] that connect to external IP networks [Page 4, Terms that are used in this draft, “An IP BNE has…”])

c. A plurality of optical cross connects, (Page 5, Figure 1, Connection between X1 and X2) for connecting the optical edge routers by the optical paths, (Page 5, Figure 1, Connections between X1 and Y2) having switching sections with respect to an optical pulse unit, wherein each of the optical edge routers has both of: an optical network control instance for maintaining topology information in the optical network (Page 9, “In provider networks, both….” to end of page) and switching/signaling the optical paths (Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9). (X1, X2, Y1 and Y2 are Optical Cross Connects [OXCs] and establish and switch optical paths connecting the edge routers [i.e. X1 and Y2] [Page 5, Figure 1, Connection between X1 and Y2 and Page 5, “X1, X2, X3,…are Optical Cross Connects (OXCs)]. It is officially noted that in an optical network, their must be an optical pulse unit to generate an optical signal, therefore the optical cross connects switch the optical paths with respect to an optical pulse unit. Intra domain link status information is disseminated using an an IGP and stored in all border network entities (BNEs) and non BNEs [Page 9, “In provider networks, both….” to end of page]. Therefore, topology information [including, at a

minimum, fiber optic link status] concerning the internal links [including the optic links] is exchanged via an IGP and stored by the border network entity (BNE)/edge router control instance. Finally, upon demand, a path for carrying packets between Client A, Location 1 and Client A, Location 2, is created when the ingress BGP speaker/edge router feeds a signal that establishes the route to the intra-domain routing process [Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9]. The path may be set up/torn down on demand [Page 8, Numeral 2].)

d. A section for notifying route information to other optical edge routers which face the optical edge router (Page 6, "2. BNEs (X1 and X3)…"). (The border network entities aggregate all the local client access points and exchange the information with other BNEs using an Interior gateway protocol [Page 6, "2. BNEs (X1 and X3)…"].)

e. An IP network instance for maintaining a routing table in each of the external IP networks (Page 4, Bottom, "The CAP information is locally maintained by the provider BNEs.") and activating routing protocols between the external IP networks and the IP network instance (Page 6, Section 4.1). (The Border Network Elements [BNEs] X1 and X3 receive the local client access point information via the BGP [Page 6, Top, "A2 Treats X1 as a BGP circuit switching neighbor" and disseminates routing information to X1]. The external network may be IP [Page 4, Terms that are used in this draft, "An IP BNE has…"]. Therefore, the BNEs/Edge Routers activate routing protocols between the external IP networks and the IP network instance. The client access point [CAP] information that is received via BGP [see above] is locally stored by the border network entities [BNE] / edge routers [Page 4, Bottom, "The CAP information is locally maintained by the provider BNEs."] and is used by the ingress BGP speaker [i.e. BNE or Edge Router] to decide which next hop to route the received IP packets to. [Page 7,

Bottom, “8. Each AS ingress BGP speaker….”]. This routing table translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is therefore in the external IP network. The IP network instance is also replicated in each of the BNEs. Therefore, an optical router maintains an IP routing table in each external network.)

For Claim 2, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses an optical network (Page 5, Middle, “X1, X2, X3…are optical Cross Connects…”) wherein the routing protocols for exchanging route information among the external IP networks are activated among the optical network control instances in the edge routers to which the external IP networks are connected (Page 6, “2. BNEs (X1 and X3)…”). (The border network entities aggregate all the local client access points and exchange the information with other BNEs using an interior gateway protocol [Page 6, “2. BNEs (X1 and X3)…”]. This information is then sent out the X edge interface using the External Border Gateway Protocol [Page 6, “4. …In this way locations 1, 2, and 3 of Client A learn each others CAG’s...”].)

For Claim 3, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses an optical network according wherein BGPs are used for protocols for exchanging the route information of the external IP networks. (Page 6, “2. BNEs (X1 and X3)…”). (The border network entities aggregate information concerning all the local client access points and exchange the information with other BNEs using an interior gateway protocol [Page 6, “2. BNEs (X1 and X3)…”].)

For Claim 4, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses an optical edge router, (Page 5, Figure 1, X1) used for an optical

network, (Page 5, Middle, “X1, X2, X3…are optical Cross Connects…”) for transmitting packets between external IP networks (Page 4, Terms that are used in this draft, “An *IP* BNE has…” and Page 5, Figure 1, Connection between Client Locations A1 and A2) and the optical edge router, (Page 5, Figure 1, Y2) comprising:

a. A section for transmitting the packets between neighboring routers in neighboring external IP networks (Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9). (On demand, the network establishes a path for carrying packets between Client A, Location 1 and Client A, Location 2 [Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9]).

b. A section for exchanging route information between the neighboring routers (Page 9, Top, “Although this document does not..."). (Routing information concerning all the available routes with possible forwarding adjacency [PFA] to a specific endpoint can be disseminated through a separate network control plane.)

c. A section for producing a routing table and storing the produced routing table in a storage section. (The Border Network Elements [BNEs] X1 and X3 receive the local client access point information via the BGP [Page 6, Top, “A2 Treats X1 as a BGP circuit switching neighbor" and disseminates routing information to X1]. The client access point [CAP] information that is received via BGP is locally stored by the border network entities [BNE] / edge routers [Page 4, Bottom, “The CAP information is locally maintained by the provider BNEs."] and is used by the ingress BGP speaker [i.e. BNE or Edge Router] to decide which next hop to route the received IP packets to [Page 7, Bottom, “8. Each AS ingress BGP speaker….”]. This routing table translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is stored in the edge router/BNE.)

d. A section for collecting topology information existing in the optical network and storing the collected topology information in a storage section (Page 9, “In provider networks, both….” to end of page). (Intra domain link status information is disseminated using an IGP and stored in all BNEs and non BNEs. Therefore, topology information [including at least link status] concerning the internal links [including the optic links] is exchanged via an IGP and stored by the border network entitiy/edge router)

e. A section for signaling so as to establish/release optical path. (On demand, a path for carrying packets between Client A, Location 1 and Client A, Location 2, is created when the ingress BGP speaker/edge router feeds a signal that establishes the route to the intra-domain routing process [Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9]. The path may be set up/torn down on demand [Page 8, Numeral 2].)

f. A section for notifying route information to other optical edge routers which face the optical edge router (Page 6, “2. BNEs (X1 and X3)…”). (The border network entities aggregate all the local client access points and exchange the information with other BNEs using a Interior gateway protocol [Page 6, “2. BNEs (X1 and X3)…”].)

g. A section for reading out the routing table and the topology information from the storage section and producing packet forwarding tables which set e.g., to where the packets are to be transmitted in the section for transmitting the packets. (The Border Network Elements [BNEs] X1 and X3 receive the local client access point information via the BGP [Page 6, Top, “A2 Treats X1 as a BGP circuit switching neighbor" and disseminates routing information to X1]. The client access point [CAP] information that is received via BGP is locally stored by the border network entities [BNE] / edge routers [Page 4, Bottom, “The CAP information is locally maintained by the provider BNEs."] and is used by the ingress BGP speaker [i.e. BNE or Edge Router] to decide which next hop

to route the received IP packets to [Page 7, Bottom, “8. Each AS ingress BGP speaker….”]. This routing table translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is stored in the edge router/BNE.)

For Claim 5, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses a program, used for optical networks and optical edge routers (Page 5, Figure 1, X1 and Page 5, Middle, “X1, X2, X3…are optical Cross Connects…”) having sections for predetermined calculations (See below) and sections for transmitting packets between the section for predetermined calculations and external IP networks, (X1 and X3 are border network elements [BNEs] that connect to external IP networks [Page 4, Terms that are used in this draft, “An IP BNE has…”]) wherein the section for the predetermined calculations comprises functions of:

a. Exchanging route information between neighboring routers in the external IP networks (Page 6, “2. BNEs (X1 and X3)…”). (The border network entities aggregate information concerning all the local client access points and exchange the information with other BNEs using an interior gateway protocol [Page 6, “2. BNEs (X1 and X3)…”]. The routing table established in the border network entity/edge router translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is therefore in the external IP network. The egress routers are also neighbors on a layer-3 (i.e. IP) level because the underlying label switched path is transparent [Page 8, 6.1.2].)

b. Producing a routing table and storing the produced routing table in a storage section. (The Border Network Elements [BNEs] X1 and X3 receive the local client access point

information via the BGP [Page 6, Top, “A2 Treats X1 as a BGP circuit switching neighbor" and disseminates routing information to X1]. The client access point [CAP] information that is received via BGP is locally stored by the border network entities [BNE] / edge routers [Page 4, Bottom, “The CAP information is locally maintained by the provider BNEs."] and is used by the ingress BGP speaker [i.e. BNE or Edge Router] to decide which next hop to route the received IP packets to [Page 7, Bottom, “8. Each AS ingress BGP speaker….”]. This routing table translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is stored in the edge router/BNE.)

c. Collecting topology information inside the optical networks and storing the collected topology information in the storage section (Page 9, “In provider networks, both….” to end of page). (Intra domain link status information is disseminated using an IGP and stored in all BNEs and non BNEs.)

d. Signaling so as to establish/release the optical paths. (On demand, a path for carrying packets between Client A, Location 1 and Client A, Location 2, is created when the ingress BGP speaker/edge router feeds a signal that establishes the route to the intra-domain routing process [Figure 1, Connection between A2 and A7 and Page 7, Numbers 7-9]. The path may be set up/torn down on demand [Page 8, Numeral 2].)

e. Notifying route information to other optical edge routers which face the optical edge router (Page 6, “2. BNEs (X1 and X3)…”). (The border network entities aggregate information concerning all the local client access points and exchange the information with other BNEs using an interior gateway protocol [Page 6, “2. BNEs (X1 and X3)…”].)

f. Reading out the routing tables and the topology information from the storage sections and producing a packet forwarding table which sets, e.g., where the packets are to be

transmitted to by the section for transmitting the packets. (The Border Network Elements [BNEs] X1 and X3 receive the local client access point information via the BGP [Page 6, Top, "A2 Treats X1 as a BGP circuit switching neighbor" and disseminates routing information to X1]. The client access point [CAP] information that is received via BGP is locally stored by the border network entities [BNE] / edge routers [Page 4, Bottom, "The CAP information is locally maintained by the provider BNEs."] and is used by the ingress BGP speaker [i.e. BNE or Edge Router] to decide which next hop to route the received IP packets to [Page 7, Bottom, "8. Each AS ingress BGP speaker…."]. This routing table translates between the external IP network [Figure 1, Client B] and the internal GMPLS network [Figure 1, Element X5] and is stored in the edge router/BNE.)

1. **Claims 6-7** are rejected under 35 U.S.C. 102(b) as being clearly anticipated by *Ueno* (US Pre Grant Publication No. 2002/0009050 A1).

For Claim 6, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses a cutting-through method for direct communication by a plurality of edge routers (*Ueno,* Figure 6, Elements 1 and 6 and Paragraphs 0008 [A "packet switch" may be a router] and 0012) connecting a core network (*Ueno,* Figure 6, Elements 2-5) and a plurality of external IP networks mutually at border points of the core network and the external IP networks (*Ueno,* Figure 6, and Paragraph 0007 and Paragraph 0038 [Showing IP addresses and ranges at the ingress/egress that indicate separate IP networks]), comprising:

a. Maintaining lists, in which ingress-side IP address correspond to identifiers for showing outgoing interfaces of egress edge routers, in ingress edge routers (*Ueno*, Figure 6, Elements 105, 106 and 6). (The ingress edge router of *Ueno*, takes the

destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port. This label is removed, along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch 6 [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6]).

b. Adding the identifiers corresponding to the ingress-side IP address to the IP packets by the ingress edge routers when IP packets are transmitted (*Ueno,* Paragraphs 27, 30-31 and 37). (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27, 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port.)

c. Transmitting the IP packets to the outgoing interfaces by referring to the identifiers added to the IP packets in the egress edge routers. (The label stack refers to [*Ueno,* Paragraph 0037] and designates the output port [It is noted that in the example in figure 6 and paragraph 0037, the labels are exchanged by intermediate label switches, however, the initial label still designates the ultimate output port by specifying a specific label path which ultimately reaches that port]. At the output the “layer 1” label is removed, along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch 6 [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6].)

For Claim 7, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses a cutting-through method wherein MPLS labels are used for the identifiers (*Ueno,* Paragraphs 27 and 30-31).

Obviousness Rejections

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Uneo (US Pre Grant Publication No. 2002/0009050 A1) as applied to claim 6 above and further in view of *Eric,* et al. (Traffic engineering with MPLS, July 17, 2002, Cisco Press, ISBN-10: 1-58705-031-5).

For Claim 8, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses correspondence information with respect to the ingress-side IP address and its corresponding identifiers is exchanged by a label assignment protocol (Paragraph 0031). (In paragraph 0031 *Ueno* discloses that a label assignment protocol may be used to assign the label to IP conversion). *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) does not disclose, but *Eric,* et al. does disclose that label assignments are exchanged among edge routers by control signals (*Eric,* Page 17). Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to combine the label distribution of *Eric,* et al. with the MPLS network of *Ueno*. The label distribution of *Eric,* et al. can be modified/implemented into the MPLS network of *Ueno* by assigning unique label paths to each egress edge router output port and associating those labels with destination IP addresses (as disclosed by *Ueno* Paragraph 0038) and then forwarding this assignment among the edge routers as stated by *Eric,* et al. (*Eric,* Page 17). The motive to combine the label distribution of *Eric,* et al. with the MPLS network of *Ueno* is to allow the network edge routers to dynamically assign and distribute label and IP combinations, allowing for increased efficiency (as opposed to manual assignment) and a creating network capable of dynamically altering its configuration.

6. **Claims 9-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) in view of *Eric,* et al. (Traffic engineering with MPLS, July 17, 2002, Cisco Press, ISBN-10: 1-58705-031-5).

For Claim 9, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses an edge router (Figure 6, Elements 1) comprising:

a. Inputting sections for connecting a core network (Figure 5, Elements 2-5) and a plurality of external IP networks at border points mutually (Paragraph 0007 and Paragraph 0038) and handling incoming IP packets, inputted from the external IP networks, to the core network (Paragraph 00027 and 30-31). (The networks at both egress edge routers [Figure 6, Elements 1 and 6] are connected to different external IP networks, as is shown by the destination IP address combinations in Paragraph 0038, which are in separate IP networks based on the IP address and subnet mask. After processing, packets received at the input interface are transmitted through the core network [Figure 6, Connections between Elements 1-6]).

c. Wherein the inputting sections has:

i. A section for maintaining lists, in which ingress-side IP addresses correspond to identifiers for showing outgoing interfaces of other egress edge routers. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port.)

ii. A section for adding the identifiers corresponding to the ingress-side IP addresses of the IP packets to the IP packets, in accordance with the lists when the IP packets are transmitted to other edge routers. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally

stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port.)

b. Outputting sections for handling outgoing IP packets outputted from the core network to the external IP networks. (The label added by the ingress edge router is label is removed at the egress router [Figure 6, Element 6], along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6])

d. Wherein the outputting section has a section for referring to the identifiers and transmitting the IP packets to the outgoing interfaces, indicated by the identifiers. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port in the outputting section of the egress router [Figure 6, Element 6]).

Ueno (US Pre Grant Publication No. 2002/0009050 A1) does not disclose that both the input and output functions are implemented in a single edge router. However, it is noted that the use of bidirectional communication was well known in the pertinent art at the time of the invention. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use bidirectional communication in the edge routers of *Ueno*. Bidirectional communication can be modified/implemented in the edge routers of *Ueno* by combining both the input and output functions of the edge ingress and egress routers of *Ueno* (Figure 6, Elements 1 and 6) in a single edge router. The motive to combine bidirectional

communication with the edge routers of *Ueno* is to allow bidirectional, communication a common and prevalent method of communication.

For Claim 10, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses an edge router wherein MPLS labels are used for the identifiers. (*Ueno,* Paragraphs 27 and 30-31).

For Claim 11, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses an edge router comprising a section for exchanging information using a label assignment protocol, in which the ingress-side IP addresses correspond to the identifiers, and wherein the section for maintaining the lists has a section for generating or updating the lists in accordance with the information obtained by the exchanging section with respect to the correspondence information between the ingress-side IP addresses and the identifiers (Paragraph 0031). (The output information is updated as the result of a label assignment protocol [Paragraph 0031]. For the remainder of the claim, see claim 9, Supra).

Ueno (US Pre Grant Publication No. 2002/0009050 A1) does not disclose, but *Eric,* et al. does disclose that label assignments are exchanged mutually among edge routers by control signals (*Eric,* Page 17). Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to combine the label distribution of *Eric,* et al. with the MPLS network of *Ueno*. The label distribution of *Eric,* et al. can be modified/implemented into the MPLS network of *Ueno* by assigning unique label paths to each egress edge router output port and associating those labels with destination IP addresses (as disclosed by *Ueno* Paragraph 0038) and then forwarding this assignment among the edge routers as stated by *Eric,* et al. (*Eric,* Page 17). The motive to combine the label distribution of *Eric,* et al. with the MPLS network of *Ueno* is to allow the network edge routers to dynamically assign and distribute label and IP combinations, allowing for increased efficiency (as opposed to manual assignment) and a creating network capable of dynamically altering its configuration.

For Claim 12, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses an apparatus, for:

a. Realizing functions corresponding to edge routers, the functions being inputting functions, for connecting a core network (Figure 5, Elements 2-5) and a plurality of external IP networks at border points mutually (Paragraph 0007 and Paragraph 0038) and handling incoming IP packets inputted from the external IP networks to the core network (Paragraph 00027 and 30-31). (The networks at both egress edge routers [Figure 6, Elements 1 and 6] are connected to different external IP networks, as is shown by the destination IP address combinations in Paragraph 0038, which are in separate IP networks based on the IP address and subnet mask. After processing, packets received at the input interface of the ingress edge router [Figure 6, Element 1 and Paragraph 0027] are transmitted through the core network [Figure 6, Connections between Elements 1-6])

b. Wherein, the inputting functions serve for:

i. A function for maintaining lists in which ingress-side IP addresses correspond to identifiers for showing outgoing interfaces of other egress edge routers. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port.)

ii. A function for adding the identifiers corresponding to the ingress-side IP addresses of the IP packets to the IP packets in accordance with the lists when the IP packets are transmitted to other edge routers. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port.)

c. Outputting functions, for handling outgoing IP packets outputted from the core network to the external IP networks. (The label added by the ingress edge router is label is removed at the egress router [Figure 6, Element 6], along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6])

d. Wherein the outputting function serves for referring to the identifiers and transmitting the IP packets, indicated by the identifiers, to the outgoing interfaces. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port in the outputting section of the egress router [Figure 6, Element 6]).

For Claim 12, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) does not disclose a program, installed to an information processing apparatus on the edge router. However, the use of programs to carry out and execute the manipulation of data through functions is well known in the art. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to execute the functions of the edge router in software. Software execution can be modified/implemented into the MPLS system of *Ueno* by having the edge router execute its functions in software and output the resulting packet. The motive to combine software execution with the MPLS system of *Ueno* is to allow for the execution of functions using software, which is generally lower cost and provides added flexibility with respect to future changes.

For Claim 13, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses a program wherein MPLS labels are used for the identifiers (*Ueno,* Paragraphs 27 and 30-31).

For Claim 14, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) discloses a program comprising a function for exchanging information using a label assignment protocol, in which the ingress-side IP addresses correspond to the identifiers, and wherein the function for maintaining the lists serves for generating or updating the lists in accordance with the information obtained by the exchanging section with respect to the correspondence information between the ingress-side IP addresses and the identifiers (Paragraph 0031). (The output information is updated as the result of a label assignment protocol [Paragraph 0031]. For the remainder of the claim, see claim11, Supra).

Ueno (US Pre Grant Publication No. 2002/0009050 A1) does not disclose, but *Eric,* et al. does disclose that label assignments are exchanged mutually among edge routers by control signals (*Eric,* Page 17). Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to combine the label distribution of *Eric,* et al. with the

MPLS network of *Ueno*. The label distribution of *Eric,* et al. can be modified/implemented into the MPLS network of *Ueno* by assigning unique label paths to each egress edge router output port and associating those labels with destination IP addresses (as disclosed by *Ueno* Paragraph 0038) and then forwarding this assignment among the edge routers as stated by *Eric,* et al. (*Eric,* Page 17). The motive to combine the label distribution of *Eric,* et al. with the MPLS network of *Ueno* is to allow the network edge routers to dynamically assign and distribute label and IP combinations, allowing for increased efficiency (as opposed to manual assignment) and a creating network capable of dynamically altering its configuration.

For Claim 15, *Ueno* (US Pre Grant Publication No. 2002/0009050 A1) does not disclose a recording medium, readable by the information processing apparatus, on which the program is recorded. However, the use of a recording medium to store programs was well known in the pertinent art at the time of the invention. Thus, it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to include a recording medium for a program implementing the functions of the edge router. A program recording medium can be modified/implemented into the edge router of *Ueno* by having the edge router implement its functions using software and storing the program on a readable medium. The motive to combine a program readable storage medium with the edge router of *Ueno* is to provide a storage medium for the program to be executed so that the program may be run on the edge router.

7. **Claims 16-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) in view of *Eric,* et al. (Traffic engineering with MPLS, July 17, 2002, Cisco Press, ISBN-10: 1-58705-031-5).

For claim 16, X*u*, et al. (IETF Draft, June 2002, A BGP/GMPLS Solution for Inter-Domain Optical Networking) discloses an information transmission network system:

a. Having a plurality of line exchangers (Figure 1, X1-X4, Page 5, "…X1-X5…are optical cross connects) and a plurality of packet exchangers (Figure 1, A2, B2, A3, A5, A7), for setting communication lines among the packet exchangers, (Page 7, Numbers 7-9) the line exchangers and the packet exchangers being connected by communication lines (Figure 1, Connection between A2 and X1, B2 and X3, exc.) wherein, the line exchangers have a line switch and a section for controlling line paths. (The plurality of line exchangers are the Optical Cross-Connects (OXCs) [Figure 1, X1-X4, Page 5, "…X1-X5…are optical cross connects], which are noted to have a line switch and a section for controlling line paths.)

b. The line switch has a function for connecting the communication lines, connected to the line exchangers, arbitrarily. (It is officially noted that optical cross connects can connect input and output ports arbitrarily.)

c. Wherein each of the packet exchangers, (Figure 1, A2, B2, A3, A5, A7) connected to the line exchangers, (Figure 1, X1-X4) has a packet switch (Page 5, A1, a2, …A7, B1, and B2 are IP routers) and a section for controlling packet paths (The client BNE controls packet paths by requesting paths to other client BNEs [i.e. Figure 1, A3, A5, A7] using BGP [Page 10, "Basic Routing Functions"]).

d. Wherein each of the *edge line exchangers* has a section for controlling line paths, (Page 7, Numbers 7-9) and a cooperative control section (The AS ingress BNE [i.e.

Figure 1, X1, X3 and Y2 when communication is in the opposite direction] stores routes to various client access groups, cooperatively distributed via an External Gateway Protocol and Interior Gateway Protocol [Page 9, “In Provider Networks, Both BNEs and non-BNEs have…”).

e. Wherein the packet switch has functions for selecting communication lines for transmission in accordance with packet-ingress-side's information transmitted via the communication lines. (The client BNE [i.e. Figure 1, A2, B2, exc.] controls packet paths by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, “Basic Routing Functions”]).

f. Wherein the sections for controlling line paths in the line exchangers are connected to the sections for controlling line paths in other line exchangers via lines the among line exchangers (Page 6, “Circuit switching neighbors have dedicated control channels).

g. Wherein the sections for controlling line paths in the *edge line* exchangers are connected to at least the sections for controlling line paths in the line exchangers via lines among the *edge line* exchangers and the line exchangers (Page 6, “Circuit switching neighbors have dedicated control channels).

h. Wherein the sections for controlling line paths in the line exchangers and the sections for controlling line paths in the *edge line* exchangers have a function for acknowledging line connection conditions in a communication network, by exchanging information of the communication conditions among the communication lines (Page 6, “For the control

traffic, circuit switching neighbors have dedicated channels", Among this control information is the intra-domain link state information, which is stored in and disseminated among the line exchangers [i.e. non- BNEs] and edge line exchangers [i.e. BNEs] [Page 9, Number 1]).

i. Wherein the section for controlling packet paths acknowledges connection-related-information with respect to packet exchange among the packet exchangers connected via the communication lines, by exchanging the information for the packet paths via the communication lines, (Page 15-16) and determines the *edge line exchanger* for output in accordance with the packet-ingress-side's information (The section for controlling packet paths in the client BNEs [i.e. A2, B2, A3, A5, A7] exchanges path information [i.e. connection related information] via a Border Gateway Protocol [Page 16, (1) and Page 17 (2)]. The client BNE [i.e. Figure 1, A2, B2, exc.] controls packet paths by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, “Basic Routing Functions”]. It is inherent that in an IP based network [Page 4, “Clients are networks that request circuit connection services. An example is an IP network…”] the connection requests are based on the ingress side information [i.e. IP address]).

j. Wherein the cooperative control sections have functions for receiving instructions regarding new communication lines, referring to two pieces of information and instructing the section for controlling line paths to set paths being used for the new communication lines. i.e. connection information, with respect to line-exchanging-network, collected by the section for controlling line paths, and connection information with respect to packet-exchange collected by the section for controlling packet paths, selecting paths, being

used for the new communication lines. (The cooperative control sections in the ingress BNEs exchange Intra-Domain connection information [i.e. line-exchanging network connection information] with the other line switches via an IGP [Page 9, Number 1]. The cooperative control sections also exchange information with the customer BNE/packet switch regarding the line paths to be established for switching which is in reference to the packet-exchanging connection information [Page 4, “The client requests circuit connection services”]. This establishment request also implicitly requires reference to the internal line exchanging network information to establish the path. [Page 7, Numbers 7-8].)

k. The section for controlling line paths has functions for transmitting messages to the line exchangers to set up lines in accordance with the instructed paths so that the line exchangers, receiving the messages for controlling and setting the connected lines, set up the communication lines, and sending control messages to the line exchangers for setting the lines in accordance with the instructed paths. (Page 7, Numbers 7-8) (The provider BNE determines the optical path to be established, then transmits this information internally to the section for controlling line paths, which transmits to the other line exchangers control messages to establish the instructed paths. [Page 7, Numbers 7-8])

X*u*, et al. does not disclose a packet exchanger that is integrated with the edge line exchanger. However, the integration of a packet exchanger and an edge line exchanger was well known in the pertinent art at the time of the invention. Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to integrate the packet

exchanger and the edge line exchanger of X*u*, et al. The packet exchanger (Figure 1, A2, B2, A3, A5, A7) and the edge line exchanger of X*u*, et al. (Figure 1, X1, X3, and Y2) can be combined by including both in the same device and maintaining the connection between each internally. The motive to combine the packet exchanger and the edge line exchanger of X*u*, et al. is to allow for an integrated device that is heaper to produce and that handles ingress packet processing for the customer.

X*u*, et al. does not disclose but *Ueno* (US Pre Grant Publication No. 2002/0009050 A1), form the same or similar field of endeavor, does disclose the packet switch has functions for selecting *communication lines for outputting* in accordance with packet-ingress-side's information transmitted via the communication lines. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port. This label is removed, along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch 6 [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6]). This it would have been obvious to combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. The output port designation of *Ueno* can be modified/implemented into the GMPLS network of X*u*, et al. by having the packet exchanger of X*u*, et al. read the packets ingress side information and designate and (if necessary) establish a label switched path that goes to the appropriate output port on the network edge router and to stack the labels necessary to reach that output port. The motive to combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. is to is provided by to employ the label stacking technique of *Ueno* therefore not requiring the an intermediate or LSR to look up and push the next label (*Ueno*, Paragraph 0010-0012).

For claim 17, X*u*, et al. does not disclose an information transmission network system for setting the communication lines among the packet exchangers and packet/line exchangers, having packet/line exchangers in which the packet exchangers and the line exchangers are integrated. However, the integration of a packet exchanger and an edge line exchanger was well known in the pertinent art at the time of the invention. Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to integrate the packet exchanger and the edge line exchanger of X*u*, et al. The packet exchanger (Figure 1, A2, B2, A3, A5, A7) and the edge line exchanger of X*u*, et al. (Figure 1, X1, X3, and Y2) can be combined by including both in the same device and maintaining the connection between each internally. The motive to combine the packet exchanger and the edge line exchanger of X*u*, et al. is to allow for an integrated device that is heaper to produce and that handles ingress packet processing for the customer.

For claim 18, X*u*, et al. discloses a packet exchanger in an information transmission network system, having a plurality of line exchangers (Figure 1, X1-X4, Page 5, "…X1-X5…are optical cross connects) and a plurality of packet exchangers, (Figure 1, A2, B2, A3, A5, A7) for setting communication lines among the packet exchangers, (Page 7, Numbers 7-9) comprising:

a. A packet switch having a function for selecting communication lines used for transmittance, in accordance with packet-ingress-side's information transmitted by the communication lines and outputting. (The client controls packet paths/communications lines used by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, "Basic Routing Functions"]).

b. At least one section for controlling line paths in *the edge line exchanger*, (Page 7, Numbers 7-9) connected to the communication lines among the packet exchangers/line

exchangers, (Page 6, “Circuit switching neighbors have dedicated control channels) for exchanging connection information of the communication lines and acknowledging line connection condition in a communication network (Page 6, “For the control traffic, circuit switching neighbors have dedicated channels"). ((Page 6, “For the control traffic, circuit switching neighbors have dedicated channels". Among this control information is the intra-domain link state information, which is stored in and disseminated among the line exchangers [i.e. non- BNEs] and edge line exchangers [i.e. BNEs] [Page 9, Number 1]).

c. A section for controlling packet paths having functions for acknowledging connection-related-information with respect to packet exchange by exchanging information of the packet paths via the communication lines among the packet exchangers connected via the communication lines and *determining an edge device for output*. (The client BNE [Figure 1, A2, B2, exc.] controls packet paths/communications lines used by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, “Basic Routing Functions”]. The section for controlling packet paths in the client BNEs [i.e. A2, B2, A3, A5, A7] exchanges path information [i.e. connection related information] via a Border Gateway Protocol [Page 16, (1) and Page 17 (2)), which is used to determine the BNEs used for output.)

d. A cooperative control section *in the edge line exchanger* having a function for receiving instructions by new communication lines, referring to two pieces of information, i.e., connection information, with respect to the packet exchange, collected by the section for controlling line paths, and connection information with respect to the packet exchange collected by the section for controlling packet paths, selecting paths used for

the new communication lines, and instructing the section for controlling line paths to set paths used for the new communication lines. (The cooperative control sections in the ingress BNEs exchange Intra-Domain connection information [i.e. line-exchanging network connection information] with the other line switches via an IGP [Page 9, Number 1]. The cooperative control sections also exchange information with the customer BNE/packet switch regarding the line paths to be established for switching which is in reference to the packet-exchanging connection information [Page 4, “The client requests circuit connection services”]. This establishment request also implicitly requires reference to the internal line exchanging network information to establish the path. [Page 7, Numbers 7-8]. Finally, the section for controlling line paths is instructed to set the paths for the new connection (Page 7, Numbers 7-9).)

e. Wherein the section for controlling line paths *in the edge line exchanger* has functions for transmitting messages to the line exchangers to set up lines in accordance with the instructed paths so that the line exchangers receive the messages for controlling and setting the connected lines, set up the communication lines, and send control messages to the line exchangers for setting the lines in accordance with the instructed paths (Page 7, Numbers 7-8). (The provider BNE determines the optical path to be established, then transmits this information internally to the section for controlling line paths, which transmits to the other line exchangers control messages to establish the instructed paths. [Page 7, Numbers 7-8])

X*u*, et al. does not disclose a packet exchanger that contains a sections for controlling line paths and a cooperative control section. However, the integration of sections for controlling

line paths and a cooperative control section with a packet exchanger was well known in the pertinent art at the time of the invention. Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to integrate line and cooperative control sections into the packet exchanger of X*u*, et al. The line and cooperative control sections can be modified/implemented into the packet exchanger of X*u*, et al. by moving the control sections (and corresponding control lines) into the packet exchanger (i.e. Client BNE, See *Xu* Figure 1, A2, B2) of *Xu*, et al and making the provider BNE (*Xu*, Figure 1 X1, X2, exc.) a simple line exchanger. The motive to combine the control sections of X*u*, et al. with the packet exchanger of X*u*, et al. is to allow the provider edge routers to be simple line exchangers and to allow the customer to control and maintain the route switching equipment for path selection.

X*u*, et al. does not disclose but *Ueno* (US Pre Grant Publication No. 2002/0009050 A1), form the same or similar field of endeavor, the packet switch has a section for controlling packet paths having functions for determining the communication lines for output. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port. This label is removed, along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch 6 [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6]). This it would have been obvious to combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. The output port designation of *Ueno* can be modified/implemented into the GMPLS network of X*u*, et al. by having the packet exchanger of X*u*, et al. read the packets ingress side information and designate and (if necessary) establish a label switched path that goes to the appropriate output port on the network edge router and to stack the labels

necessary to reach that output port. The motive to combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. is to is provided by to employ the label stacking technique of *Ueno* therefore not requiring the an intermediate or LSR to look up and push the next label (Paragraph 0010-0012).

For claim 19, X*u*, et al. discloses a packet/line exchanger in an information transmission network system, having a plurality of line exchangers (Figure 1, X1-X4, Page 5, "…X1-X5…are optical cross connects) and a plurality of packet exchangers, (Figure 1, A2, B2, A3, A5, A7) for setting communication lines among the packet exchangers comprising:

a. Line switches, *within the edge line exchangers*, connected to the line exchangers, having a function for connecting the communication lines arbitrarily. (It is officially noted that optical cross connects contain line switches that can connect input and output ports arbitrarily.)

b. A packet switch (Figure 1, A2, B2, A3, A5, A7) having a function for selecting communication lines used for transmittance, in accordance with packet-ingress-side's information transmitted by the communication lines and outputting the same. (The client BNE controls packet paths and therefore selects the communications lines used for transmittance by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, "Basic Routing Functions"]. This is done in accord with the packets ingress side information by the IP router [Page 4, "an example is an IP router that is interconnected by an optical transport backbone]).

b. At least a section, contained in the *edge line exchanger,* for controlling line paths in the line exchangers, (Page 7, Numbers 7-9) connected to the communication lines

among the packet exchangers/line exchangers, (Page 6, “Circuit switching neighbors have dedicated control channels) for exchanging connection information of the communication lines and acknowledging line connection conditions in a communication network (Page 9, Number 1). (The section for controlling line paths is stored in the line exchanger which sets up the label switched paths [Page 7, Numbers 7-9]. This is connected to the line exchanger [Page 6, “Circuit switching neighbors have dedicated control channels]. Furthermore, line conditions are acknowledged by the control traffic, which contains the intra-domain link state information, which is stored in and disseminated among the line exchangers [i.e. non- BNEs] and edge line exchangers [i.e. BNEs] [Page 9, Number 1]).

c. A section for controlling packet paths *in the packet exchanger* having functions for acknowledging connection-related-information with respect to packet exchange by exchanging information of the packet paths via the communication lines among the packet exchangers connected via the communication lines, and *determining an egress edge device for output*. (The client BNE [Figure 1, A2, B2, exc.] controls packet paths/communications lines used by requesting paths to other client BNEs (i.e. Figure 1, A3, A5, A7) using BGP [Page 10, “Basic Routing Functions”]. The section for controlling packet paths in the client BNEs [i.e. A2, B2, A3, A5, A7] exchanges path information [i.e. connection related information] via a Border Gateway Protocol [Page 16, (1) and Page 17 (2)), which is used to determine the BNEs used for output.)

d. A cooperative control section *in the edge line exchanger* having a function for receiving instructions by new communication lines, referring to two pieces of information, i.e., connection information, with respect to the packet exchange, collected by the section for controlling line paths, and connection information with respect to the packet exchange collected by the section for controlling packet paths, selecting paths used for the new communication lines, and instructing the section for controlling line paths to set paths being used for the new communication lines. (The cooperative control sections in the ingress BNEs exchange Intra-Domain connection information [i.e. line-exchanging network connection information] with the other line switches via an IGP [Page 9, Number 1]. The cooperative control sections also exchange information with the customer BNE/packet switch regarding the line paths to be established for switching which is in reference to the packet-exchanging connection information [Page 4, "The client requests circuit connection services"]. This establishment request also implicitly requires reference to the internal line exchanging network information to establish the path. [Page 7, Numbers 7-8]. Finally, the section for controlling line paths is instructed to set the paths for the new connection (Page 7, Numbers 7-9).)

e. Wherein the section for controlling line paths *in the edge line exchanger* has functions for transmitting messages to the line exchangers to set up lines in accordance with the instructed path, instructed by the cooperative control section, so that the line exchangers, receive the messages for controlling and setting the connected lines, set up the communication lines, and send control messages to the line exchangers for setting the lines in accordance with the instructed paths (Page 7, Numbers 7-8). (The provider BNE control section determines the optical path to be established, then transmits this

information internally to the section for controlling line paths, which transmits to the other line exchangers control messages to establish the instructed paths [Page 7, Numbers 7-8].)

X*u*, et al. does not disclose a packet exchanger that is integrated with the edge line exchanger. However, the integration of a packet exchanger and an edge line exchanger was well known in the pertinent art at the time of the invention. Thus it would have been obvious to a person of ordinary skill in the pertinent art at the time of the invention to integrate the packet exchanger and the edge line exchanger of X*u*, et al. The packet exchanger (Figure 1, A2, B2, A3, A5, A7) and the edge line exchanger of X*u*, et al. (Figure 1, X1, X3, and Y2) can be combined by including both in the same device and maintaining the connection between each internally. The motive to combine the packet exchanger and the edge line exchanger of X*u*, et al. is to allow for an integrated device that is heaper to produce and that handles ingress packet processing for the customer.

X*u*, et al. does not disclose but *Ueno* (US Pre Grant Publication No. 2002/0009050 A1), form the same or similar field of endeavor, does disclose the line switch/packet switch has functions for selecting communication lines for *output* in accordance with packet-ingress-side's information transmitted via the communication lines. (The ingress edge router of *Ueno*, takes the destination IP address and generates and pushes a series of MPLS labels to guide the packet through the MPLS network from an internally stored “list” or routing table [*Ueno,* Paragraphs 27 and 30-31]. The label of "layer 1” of the label stack refers to [*Ueno,* Paragraph 0037] and designates the output port. This label is removed, along with any remaining MPLS encapsulation information, and the packet is output from the edge router/Packet Switch 6 [*Ueno*, Paragraph 0037, and Figure 6, Elements 105, 106 and 6]). This it would have been obvious to

combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. The output port designation of *Ueno* can be modified/implemented into the GMPLS network of X*u*, et al. by having the packet exchanger of X*u*, et al. read the packets ingress side information and designate and (if necessary) establish a label switched path that goes to the appropriate output port on the network edge router and to stack the labels necessary to reach that output port. The motive to combine the output port designation of *Ueno* with the GMPLS network of X*u*, et al. is to is provided by to employ the label stacking technique of *Ueno* therefore not requiring the an intermediate or LSR to look up and push the next label (Paragraph 0010-0012).

Prior Art made of Record and not Relied Upon

The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Yamauchi, (US Patent No. 7,272,146 B2)

Brahim, et al. (Us Pre Grant Publication No. 2003/0147402)

Contact Information

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Crutchfield whose telephone number is (571) 270-3989. The examiner can normally be reached Monday through Friday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber, can be reached at 571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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